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EXAMINER	
MULLINS, BURTON S	
ART UNIT	PAPER NUMBER
2834	

DATE MAILED: 06/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/667,327	THIOT, DENIS	
	Examiner	Art Unit	
	Burton S. Mullins	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 May 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,11 and 12* is/are rejected.

7)☒ Claim(s) *10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-3, 5 and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB 724,875 (GB '875) in view of Sapper et al. (US 3,969,643). GB '875 teaches a dynamo-electric machine including: a rotor 11 and stator 28 with a gap (not numbered, p.3, line 23) between the rotor and the stator, the gap having ends (Fig.3); baffles (not numbered, Fig.3) at the ends of the gap; a substantially hermetically sealed enclosure (outer housing 35) filled with a gaseous coolant (e.g., hydrogen, p.2, line 46) at superatmospheric pressure and including a coolant receiving region (not numbered, p.2, line 46-47) at each end of the rotor, adjacent grooves/openings 13; the rotor and the stator positioned in the enclosure (Fig.3); the stator including a core 28 (Fig.3), cooling ducts 29 in the stator core (Fig.3), and windings 30 which form a winding overhang at each end of the stator (Fig.3), the rotor including cooling channels 13/16/17 (Figs.1,3&4); wherein, when the generator is operating, and when the generator is in fluid communication with a cooling apparatus (coolers 32) in fluid communication with the generator and inside housing 35, gaseous coolant flows in a circuit from the cooling apparatus 32 past the winding overhangs, then through cooling channels 13/14/16/17 in the rotor, then into said gap, then through the cooling ducts 29 in the stator core into the coolant receiving region (adjacent coolers 32), and then through the cooling apparatus 32 (see arrows showing circulation, Fig.3).

The baffles in GB '875 do not specifically "both [inhibit] escape of the gaseous coolant from the ends of said gap and [inhibit] entry of the gaseous coolant into the gap through its ends,

the flow of gaseous coolant around said cooling circuit being caused solely by the centrifugal force acting on the gaseous coolant in the cooling channels of the rotor."

Sapper teaches a gas-cooled generator including a rotor 1 and stator 2 with a gap 17 between the rotor and the stator, baffles (dividing device) 8 each comprising extending cylindrical portion 10 at the ends of the gap (Fig.2); a substantially hermetically sealed enclosure (stator-rotor space 12) filled with a gaseous coolant at superatmospheric pressure; wherein, when the generator is operating, and when the generator is in fluid communication with a cooling apparatus (part of which comprises gas coolant flow outlet space 3), gaseous coolant flows in a circuit from the cooling apparatus past the winding overhangs 11, then through cooling channels 15 in the rotor, then into said gap 17, then through the cooling ducts 13 in the stator core into the coolant receiving region (flow outlet space) 3, and then through the cooling apparatus (inherent thereto), the baffles 8/10 both inhibiting escape of the gaseous coolant from the ends of said gap and inhibiting entry of the gaseous coolant into the gap through its ends by means of seal 18 (c.3, lines 29-35; c.4, lines 8-17), the flow of gaseous coolant around said cooling circuit being caused solely by the centrifugal force acting on the gaseous coolant in the cooling channels of the rotor (c.3, lines 35-41). Thus, the need to use an axial fan to provide additional pressure is eliminated (c.1, lines 21-31 & c.3, lines 38-39).

It would have been obvious to modify GB '875 and provide a baffle and seal per Sapper which inhibit escape of the gaseous coolant from the ends of said gap and entry of the gaseous coolant into the gap through its ends since they would have been desirable to eliminate the need to use an axial fan to provide additional pressure.

Regarding claim 5, though neither GB '875 nor Sapper teach specific ranges for the superatmospheric pressures inside their machines, it would have been obvious to provide a range of at least 10 bar since it has been held that optimum ranges involve ordinary skill. In re Aller, 105 USPQ 233 (CCPA 1955).

Regarding claim 8, the rotor comprises end portions which extend beyond the stator core, and axial and radial cooling channels 13/16.

3. Claims 1-5 and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB 1,170,754 (GB '754) in view of Sapper et al. (US 3,969,643). GB '754 teaches a dynamo-electric machine including: a rotor 1 and stator 15 with a gap (not numbered, Fig.) between the rotor and the stator, the gap having ends (Fig.); baffles (shrouds) 25 at the ends of the gap; a substantially hermetically sealed enclosure (casing) 19 filled with a gaseous coolant (e.g., hydrogen, p.1, lines 29-44) at superatmospheric pressure and including a coolant receiving region (not numbered, Fig.) at each end of the rotor; the rotor and the stator positioned in the enclosure 19 (Fig.); the stator including a core (Fig.), cooling ducts 17 in the stator core and windings (Fig.) which form a winding overhang at each end of the stator (Fig.), the rotor including cooling channels 5/7; wherein, when the generator is operating, and when the generator is in fluid communication with a cooling apparatus (heat exchangers 29) in fluid communication with the generator and inside housing 19, gaseous coolant flows in a circuit from the cooling apparatus 29 past the winding overhangs, then through cooling channels 5/7 in the rotor, then into said gap, then through the cooling ducts 17 in the stator core into the coolant receiving region (passage 27), and then through the cooling apparatus 29 (see arrows showing circulation, Fig.).

The baffles in GB '754 do not specifically "both [inhibit] escape of the gaseous coolant from the ends of said gap and [inhibit] entry of the gaseous coolant into the gap through its ends, the flow of gaseous coolant around said cooling circuit being caused solely by the centrifugal force acting on the gaseous coolant in the cooling channels of the rotor."

As described in paragraph 5 above, Sapper teaches a gas-cooled generator including baffles (dividing device) 8/10 at the ends of the gap and a seal 18 (c.3, lines 29-35; c.4, lines 8-17), both of which enable flow of gaseous coolant around the cooling circuit solely by centrifugal force acting on the gaseous coolant in the cooling channels of the rotor (c.3, lines 35-41). Thus, the need to use an axial fan to provide additional pressure is eliminated (c.1, lines 21-31 & c.3, lines 38-39).

It would have been obvious to modify GB '754 and provide a baffle and seal per Sapper which inhibit escape of the gaseous coolant from the ends of said gap and entry of the gaseous coolant into the gap through its ends since they would have been desirable to eliminate the need to use an axial fan to provide additional pressure.

Regarding claim 5, though neither GB '754 nor Sapper teach specific ranges for the superatmospheric pressures inside their machines, it would have been obvious to provide a range of at least 10 bar since it has been held that optimum ranges involve ordinary skill. In re Aller, 105 USPQ 233 (CCPA 1955).

Regarding claim 8, the rotor comprises end portions which extend beyond the stator core, and axial and radial cooling channels 5/17.

4. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over either GB '875 or GB '754, in view of Sapper, and further in view of Jampen (US 3,816,751). Neither GB '875, GB '754 nor Sapper teach helium as the coolant.

Jampen teaches that helium is known to be used in gas-driven turbogenerator sets for the purpose of cooling and because, unlike hydrogen, it is not combustible (c.1, lines 44-46; c.2, lines 30-35).

It would have been obvious to modify either GB '875 or GB '754, in view of Sapper, and employ a noble gas such as helium as the coolant in a turbogenerator per Jampen since helium can be used to cool the generator and is not combustible.

5. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over either GB '875 or GB '754, in view of Sapper, and further in view of Kudlacik et al. (US 3,702,964). Neither GB '875, GB '754 nor Sapper teach an exciter, per se.

Kudlacik teaches an internal static (non-rotating) exciter comprising supplemental excitation windings 20a in the stator slots for high response, simple control and range adjustment (c.2, lines 22-30) which can be integrated into gas cooled generators in a compact manner. The exciter provides compounded excitation power for the field windings (c.1, lines 5-10).

It would have been obvious to modify either GB '875 or GB '754, in view of Sapper, and provide an exciter per Kulacik since it would have been desirable to provide a responsive and easily-controlled means to produce compounded excitation power for the field windings.

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over either GB '875 or GB '754, in view of Sapper, and further in view of Crowdy et al (US 4,049,972). Neither GB '875, GB '754 nor Sapper a vertical generator.

Crowdy teaches that is desirable to position turbo-alternator plants vertically to reduce bearing loads (c.1, line 41-46).

It would have been obvious to modify either GB '875 or GB '754, in view of Sapper, and employ a vertical generator per Crowdy since a vertical orientation would have been desirable to reduce bearing loads.

Allowable Subject Matter

7. Claim 10 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not teach the claimed machine including part of the cooling flow flowing past a bearing.

Response to Arguments

8. Applicant's arguments filed May 9, 2005 have been fully considered but they are not persuasive.

Applicant's assertion that GB '875 Fig.3 does not teach coolant flow past the winding overhang, but rather through openings well-spaced from the overhangs is not persuasive because even if one could consider the openings to be well-spaced from the overhangs, the coolant flow would still "flow...past the winding overhangs" as recited in claim 1, since "flow...past" does not necessarily mean there must be direct cooling flow *onto* the windings, but merely that cooling flow passes in the vicinity of the windings, as it does in GB '875. Further, the fact that

the ventilation is driven in part by an additional axial fan is implicit in the acknowledgement by the examiner of what GB '875 does not teach.

Regarding the combination, applicant's argument is that Sapper's indication (20) of cool air flow (Figs.1&3) entering from what appears to be outside the housing means that Sapper's machine housing is an open-ventilation machine housing, not a closed-ventilation machine housing like GB '875.

However, this is not convincing because the arrow 20 is schematic in nature and, absent any specific teaching in Sapper, indicates only the fact that there is inflow and outflow of cooling gas into respective inlet and outlet spaces. The drawings cannot be relied upon to teach elements when the drawings in light of the specification do not clearly teach such elements to one of ordinary skill. Sapper's disclosure is silent regarding the nature of the inflow of cooling gas and whether or not it is pressurized, neither is there anything in the disclosure that would imply that Sapper must be an open-ventilation machine. Sapper only says that reference number 20 is a "cooling gas" (c.3, line 6) or "cooling-gas stream" (c.3, line 25). There is no suggestion as to the nature or structure of the source of the gas or gas stream.

Furthermore, even if Sapper was exclusively an open-ventilation machine, applicant's argument that Sapper is non-analogous art since it does not pertain to a closed, pressurized system is not persuasive. It has been held that analogous art must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case,

Sapper meets both requirements since it is in the same field of art (generators) and is directed to the same particular problem of generator cooling.

In response to applicant's argument that the machine of the combination of GB '875 and Sapper is unworkable, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In this case, Sapper teaches that it would have been obvious to modify GB '875 and provide a baffle and seal which inhibit escape of cooling gases from the ends of the rotor/stator gap and entry of gas into the gap at either end because this would provide the gastight partition between the channel 7 and the flow inlet/outlet spaces which separates flow between the two areas (c.2, lines 21-28) and eliminates the need for a fan as an additional pressure generator (c.2, lines 29-31; c.3, lines 38-41).

Regarding claim 5, it has been held that optimum ranges, in order to be patentable, should produce a new and unexpected result which is different in kind and not merely in degree from results in the prior art. Such ranges are "critical" and the applicant has the burden of proving such criticality. Applicant's argument that gas at such pressure would leak at the rotating seals is not persuasive because, according to applicant's argument, leakage and therefore capacity of the device would appear to depend on the degree of quality of the seals. High quality seals would not produce a new and unexpected result since the quality of the seals correlates directly with the degree of gas leakage and, by extension, capacity.

Regarding the rejections of claims 1-5 and 8-9 in view of Davidson (GB '754) and Sapper, applicant argues that in Davidson the coolant "barely licks the stator winding overhangs on their internal face, instead of passing through them, and the coolant flowing past the winding overhangs does not then flow through cooling channels in the rotor but passes through ducts 33 in the stator". Regarding the former assertion, Davidson meets the claim language of "gaseous coolant flows...past the winding overhangs" because, as described in the specification, some coolant gas discharged by fan 23 is separately directed to the radial ducts 33 (c.2, lines 55-56). This separate discharge "flows past" the winding overhangs, as seen in the figure and denoted by the arrow. Regarding the latter assertion, the examiner notes contrary to applicant's assertion, coolant flows past a portion of the end windings before entering passages 5 and 7 in the rotor, as indicated by arrows in the figure and described at p.1, lines 71-80 and p.2, lines 25-31.

Applicant's assertions that Davidson and Sapper are non-analogous are not persuasive for the same reasons given in the discussion above of the rejection over GB '875 and Sapper.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Burton S. Mullins whose telephone number is 571-272-2029. The examiner can normally be reached on Monday-Friday, 9 am to 5 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on 571-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Burton S. Mullins
Primary Examiner
Art Unit 2834

bsm
7 June 2005